



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/076,536	02/19/2002	Takeyuki Itabashi	A8319.0014/P014	1688

24998 7590 09/11/2003

DICKSTEIN SHAPIRO MORIN & OSHINSKY LLP
2101 L STREET NW
WASHINGTON, DC 20037-1526

EXAMINER

WONG, EDNA

ART UNIT	PAPER NUMBER
----------	--------------

1753

DATE MAILED: 09/11/2003

6

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/076,536

Applicant(s)

ITABASHI ET AL.

Examiner

Edna Wong

Art Unit

1753

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1 is/are allowed.
- 6) ☒ Claim(s) 2-9 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 5.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

Specification

Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

The abstract of the disclosure is objected to because:

- (a) the abstract is more than one paragraph long; and
- (b) the word "said" is used in lines 12-14.

Correction is required. See MPEP § 608.01(b).

Claim Rejections - 35 USC § 112

Claims 4-8 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 4

lines 2-5, it is unclear if the electroless plating solution further contains sodium

ion, iron ion, nitrate ion **and** nitrite ion (all 4 types of ions), or if the electroless plating solution further contains sodium ion, iron ion, nitrate ion **or** nitrite ion (at least one of the ions).

Claim 5

lines 5-6, it appears that "a plating bath" is the same as the plating solution recited in claim 5, line 5. However, it is unclear if it is. If it is, then it is suggested that the word "a" be amended to the word -- the --.

Claim 6

line 6, it appears that "a preparation" is the same as the preparation recited in claim 5, line 5. However, it is unclear if it is. If it is, then it is suggested that the word "a" be amended to the word -- the --.

line 6, it appears that "a plating bath" is the same as the plating solution recited in claim 6, lines 5-6. However, it is unclear if it is. If it is, then it is suggested that the word "a" be amended to the word -- the --.

line 7, it appears that "a plating treatment" is the same as the plating treatment recited in claim 5, line 6. However, it is unclear if it is. If it is, then it is suggested that the word "a" be amended to the word -- the --.

Art Unit: 1753

line 7, it appears that "a body" is the same as the body recited in claim 5, line 6. However, it is unclear if it is. If it is, then it is suggested that the word "a" be amended to the word -- the --.

line 8, it appears that "a period of time" is further limiting the period of time recited in claim 6, line 4. However, it is unclear if it is.

Claim 7

lines 5-6, it appears that "a plating bath" is the same as the plating solution recited in claim 7, line 5. However, it is unclear if it is. If it is, then it is suggested that the word "a" be amended to the word -- the --.

Claim 8

line 6, it appears that "a preparation" is the same as the preparation recited in claim 7, line 5. However, it is unclear if it is. If it is, then it is suggested that the word "a" be amended to the word -- the --.

line 6, it appears that "a plating bath" is the same as the plating solution recited in claim 8, lines 5-6. However, it is unclear if it is. If it is, then it is suggested that the word "a" be amended to the word -- the --.

Art Unit: 1753

line 7, it appears that "a plating treatment" is the same as the plating treatment recited in claim 7, line 6. However, it is unclear if it is. If it is, then it is suggested that the word "a" be amended to the word -- the --.

line 7, it appears that "a base board" is the same as the body recited in claim 7, lines 6-7. However, it is unclear if it is. If it is, then it is suggested that the word "a" be amended to the word -- the --.

lines 7-8, it appears that "a period of time" is further limiting the period of time recited in claim 8, line 4. However, it is unclear if it is.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Plating Bath

I. Claims 2-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Datta et al.** (US Patent Application Publication No. 2002/0064592 A1) in combination with **JP 2000-144438** ('438) and Applicants' admitted prior art (specification, page 18, lines 2-19).

Datta teaches an electroless copper plating solution comprising:

- (a) copper ion (= a source of Cu) [page 3, ¶ [0031]],
- (b) a complexing agent for copper ion (= EDTA) [page 3, ¶ [0033]],
- (c) a reducing agent for copper ion (= glyoxylic acid) [page 3, ¶ [0031]], and
- (d) a pH adjusting agent (= KOH) [page 3, ¶ [0032]],

wherein said reducing agent for copper ion is glyoxylic acid or a salt thereof (page 3, ¶ [0031]) and said pH adjusting agent is potassium hydroxide (page 3, ¶ [0032]).

The electroless copper plating solution further contains polyethylene glycol or polypropylene glycol (page 3, ¶ [0034])

The electroless copper plating solution further contains nitrite ion (from copper nitrate) [page 3, ¶ [0031]; and also see Applicants' admitted prior art (specification, page 18, lines 2-19) for a formulation of a prior art plating solution].

Datta does not teach wherein said electroless copper plating solution contains at least one member selected from the group consisting of a primary amine, a secondary amine and methanol in an amount of 0.001 mol/L or more; and wherein the nitrate ion is in an amount of 10 mg/L or less.

However, JP '438 teaches that adding methanol in the plating liquid prevents degradation of the plating liquid resulting from a Cannizzaro reaction (page 2, ¶

[0008]).

Thus, the invention as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made because one skilled in the art would have been motivated to have modified the electroless copper plating bath of Datta with wherein said electroless copper plating solution contains methanol because this would have prevented the degradation of the plating liquid resulting from a Cannizzaro reaction as taught by JP '438 (page 2, ¶ [0008]).

As to an amount of 0.001 mol/L or more, the concentration of the methanol is a result-effective variable and one skilled in the art has the skill to calculate the concentration that would determine the success of the desired reaction to occur, i.e., prevent degradation of the plating liquid resulting from a Cannizzaro reaction, absent evidence to the contrary. MPEP § 2141.03 and § 2144.05(b).

As to wherein the nitrate ion is in an amount of 10 mg/L or less, the nitrate ion concentration is a result-effective variable and one skilled in the art has the skill to calculate the concentration that would determine the success of the desired reaction to occur, absent evidence to the contrary. MPEP § 2141.03 and § 2144.05(b).

Process

II. Claims **5 and 6** are rejected under 35 U.S.C. 103(a) as being unpatentable over

Datta et al. (US Patent Application Publication No. 2002/0064592 A1) in combination with **JP 2000-144438** ('438) and Applicants' admitted prior art (specification, page 18, lines 2-19) as applied to claims 2-4 above, and further in view of **JP 07-268638** ('638).

The Datta combination is as applied above and incorporated herein.

Datta also teaches an electroless copper plating process using the electroless copper plating solution according to claim 2 (page 3, ¶ [0039]).

Datta does not teach continuously circulating and filtering the plating solution after a preparation of a plating bath but prior to a plating treatment of a body to be plated.

However, JP '638 teaches continuously circulating **2** and filtering **5** an electroless plating solution after a preparation of a plating bath **3** but prior to a plating treatment **1** of a body to be plated (abstract).

Thus, the invention as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made because one skilled in the art would have been motivated to have modified the process of Datta by continuously circulating and filtering the plating solution after a preparation of a plating bath but prior to a plating treatment of a body to be plated because this would have prevented the accumulation

of by-product ions formed in accordance with the progress of an electroless plating reaction and prolonged the service life of the electroless plating solution as taught by JP '638 (abstract).

As to wherein a period of time T required for continuously circulating and filtering the plating solution after a preparation of a plating bath but prior to a plating treatment of a body to be plated is a period of time satisfying: $Y \cdot T > 3V$, wherein V denotes a quantity of the plating solution and Y denotes a quantity of circulation per unit time, the period of time required for continuously circulating and filtering the plating solution is a result-effective variable and one skilled in the art has the skill to calculate the time that would determine the success of the desired reaction to occur, e.g., to keep the salt concentration at a certain value, absent evidence to the contrary. MPEP § 2141.03 and § 2144.05(b).

III. Claims **7 and 8** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Datta et al.** (US Patent Application Publication No. 2002/0064592 A1) in combination with **JP 2000-144438** ('438) and Applicants' admitted prior art (specification, page 18, lines 2-19) as applied to claims 2-4 above, and further in view of **JP 07-268638** ('638).

The Datta combination and JP '638 are as applied above and incorporated herein.

Datta also teaches a process for producing a circuit board using the electroless copper plating solution according to claim 2.

IV. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over **Datta et al.** (US Patent Application Publication No. 2002/0064592 A1) in combination with **JP 2000-144438** ('438) and Applicants' admitted prior art (specification, page 18, lines 2-19) as applied to claims 2-4 above.

The Datta combination is as applied above and incorporated herein.

Datta also teaches a process for producing a circuit board, which comprises:

(a) forming a copper film by the use of the electroless copper plating solution according to claim 2, and thereafter,

(b) electroplating by using said copper film as a seed film (= electroless deposition of Cu seed layers) for electroplating (page 3, ¶ [0039] and [0041]; and Fig. 3).

Allowable Subject Matter

The following is a statement of reasons for the indication of allowable subject matter:

Claim 1 defines over the prior art of record because the prior art does not teach or suggest an electroless copper plating solution comprising copper ion, a complexing

agent for copper ion, a reducing agent for copper ion and a pH adjusting agent, wherein said reducing agent for copper ion is glyoxylic acid or a salt thereof, said pH adjusting agent is potassium hydroxide, and said electroless copper plating solution contains at least one member selected from the group consisting of metasilicic acid, a salt of metasilicic acid, germanium dioxide, a salt of germanic acid, phosphoric acid, a salt of phosphoric acid, vanadic acid, a salt of vanadic acid, stannic acid and a salt of stannic acid in an amount of 0.0001 mol/L or more.

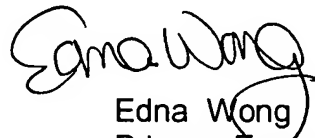
The prior art does not contain any language that teaches or suggests the above. *Datta et al.* do not teach wherein the electroless copper plating solution contains at least one member selected from the group consisting of metasilicic acid, a salt of metasilicic acid, germanium dioxide, a salt of germanic acid, phosphoric acid, a salt of phosphoric acid, vanadic acid, a salt of vanadic acid, stannic acid and a salt of stannic acid in an amount of 0.0001 mol/L or more. Therefore, a person skilled in the art would not have been motivated to adopt the above conditions, and a prima facie case of obviousness cannot be established.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Edna Wong whose telephone number is (703) 308-3818. The examiner can normally be reached on Mon-Fri 7:30 am to 5:00 pm, alt. Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Nam Nguyen can be reached on (703) 308-3322. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-1495.


Edna Wong
Primary Examiner
Art Unit 1753

EW
September 10, 2003